CANDIDATE AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: Pituophis ruthveni

COMMON NAME: Louisiana pine snake

LEAD REGION: 4

INFORMATION CURRENT AS OF: January 5, 2001

STATUS/ACTION (Check all that apply):
_ New candidate
_X_ Continuing candidate
    _X_ Non-petitioned
    ___ Petitioned - Date petition received: ___
        ___ 90-day positive - FR date: ___
        ___ 12-month warranted but precluded - FR date: ___
        _ Is the petition requesting a reclassification of a listed species?
    ___ Listing priority change
        Former LP: ___
        New LP: ___
___ Candidate removal: Former LP: ___ (Check only one reason)
    ___ A - Taxon more abundant or widespread than previously believed or not subject to a degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.
    ___ F - Range is no longer a U.S. territory.
    ___ M - Taxon mistakenly included in past notice of review.
    ___ N - Taxon may not meet the Act's definition of "species."
    ___ X - Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Reptile - Colubridae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Louisiana, Texas

CURRENT STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Louisiana, Texas

LEAD REGION CONTACT (Name, phone number): Lee Andrews, 404/679-7217

LEAD FIELD OFFICE CONTACT (Office, name, phone number): Jackson, Mississippi Field Office, Linda LaClaire, 601/321-1126

BIOLOGICAL INFORMATION (Describe habitat, historic vs. current range, historic vs. current population estimates (# populations, #individuals/population), etc.):

Stull (1929) formally described the Louisiana pine snake as a pine snake subspecies (Pituophis melanoleucus ruthveni) based on two specimens taken in Rapides Parish, Louisiana. Reichling (1995) reassessed this snake's taxonomic status and concluded that it is a valid evolutionary species, both geographically isolated and genetically distinct. The Louisiana pine snake has subsequently been accepted as a full species, Pituophis ruthveni (Collins 1997).

Louisiana pine snake habitat consists of longleaf pine savannah with sandy, well-drained soils and substantial herbaceous ground cover. Pocket gophers (Geomys breviceps) are an essential component of this habitat. They create burrow systems where Louisiana pine snakes are most frequently found and are a major source of food for the species (Rudolph and Conner 1996, Rudolph in litt. 1997). Movement patterns of pine snakes are typically from one pocket gopher burrow system to another (Rudolph in litt. 1997).

The Louisiana pine snake historically occurred in portions of west-central Louisiana and extreme east-central Texas. This area roughly coincides with a disjunct portion of the longleaf pine ecosystem situated west of the Mississippi River. The range of the Louisiana pine snake included parts of 7 parishes in Louisiana and 13 counties in Texas (Jennings and Fritts 1983, Rudolph 2000). Records from two additional parishes in Louisiana (Williams and Cordes 1996) are considered suspect and have not been included (S. Shively, Louisiana Natural Heritage Program, pers. comm. 1999). Historical records (those prior to 1990) are few and the Louisiana pine snake is recognized as one of the rarest snakes in North America (Young and Vandeventer 1988). Only two specimens were known prior to collections made in the late 1940's (Wright and Wright 1957). This is unfortunate because most of the sandy longleaf pine dominated savannahs preferred by the Louisiana pine snake had disappeared by the mid-1930's (Bridges and Orzell 1989, Frost 1993). It is likely that much of the loss of Louisiana pine snake habitat occurred in the early 1900's.

Rudolph (2000) conducted a habitat assessment of all known historical localities of the Louisiana pine snake. Although most of the historical collecting sites are difficult to relocate due to vague locality information, Rudolph felt limited inaccuracy in locating sites should not invalidate overall conclusions about habitat quality. Based on his radio-telemetry research, he made the assumption that viable populations of Louisiana pine snakes are dependent on habitat at the scale of several kilometers (miles). He therefore evaluated habitat within a 2 kilometer (km) (1.24 mile (mi)) radius of the vicinity where a locality was thought to occur. Percent forest cover, percent herbaceous cover, soil type, and the presence or absence of pocket gophers was recorded for each site. Each locality was categorized as excellent, good, marginal, or poor based on this characterization and habitat preferences of the Louisiana pine snake. Rudolph found that the landscape within the 2 km (1.24 mi) radius usually scored predominately in one category. Using this methodology, a total of 77 localities were assessed. Of these, only 26 (34%) were considered capable of supporting a viable population of Louisiana pine snakes.

Rudolph (pers. comm. 1999) conducted extensive trapping in eight areas of Louisiana and Texas identified as having the best remaining habitat for Louisiana pine snakes. Trapping was conducted in some areas for 1 year, and in others for as long as 5 years, in an attempt to capture snakes for use in radio-telemetry research. Only 19 snakes were trapped in over 20,000 trap days (1 snake/1,000 trap days). Trapping data suggest that the largest population occurs on industrial forest land in Bienville Parish, Louisiana.

Louisiana pine snakes have not been documented in over a decade in some of the best remaining habitat within their historical range (Rudolph, pers. comm. 1999; S. Shively, pers. comm. 1999). This suggests that the species is no longer present, or extremely rare in portions of its previous distribution. Surveys documenting the current condition of the fire climax longleaf pine forests, and results of Louisiana pine snake trapping and radio-telemetry, suggest that extensive population declines and local extirpations have occurred during the last 50 to 80 years (Rudolph in litt. 1997).

THREATS (Describe threats in terms of the five factors in section 4 of the ESA providing specific, substantive information. **If this is a removal of a species from candidate status or a change in listing priority, explain reasons for change**):

A. The present or threatened destruction, modification, or curtailment of its habitat or range. Both the quantity and quality of longleaf pine savannah have declined sharply in Louisiana and Texas. Virtually all remaining virgin timber in the south was cut during intensive logging from 1870 to 1920 (Frost 1993). In the 1920's, foresters began converting unmanaged woodlands to pine plantations (Frost 1993). Wahlenberg (1946) estimated that in 1935, 1.2 million hectares (approximately 3 million acres) of longleaf pine type forests remained in southwest Louisiana and southeast Texas. However, 43 percent of these longleaf pine types consisted of clear-cuts and only 2.9 percent were uncut old-growth stands. Bridges and Orzell (1989) used published data from the 1980's to make more current estimates of the natural longleaf pine forests remaining in Louisiana and Texas. They estimated that in Louisiana only 15 percent, and in Texas only 7.5 percent of the 1935 acreages remained. The quality of remaining Louisiana pine snake habitat has been degraded due to logging, fire suppression, short-rotation silviculture, and conversion of habitat to other uses such as grazing.

   The Bienville Parish population of Louisiana pine snakes, arguably the largest extant population, occurs on industrial forest land where the current saw timber stands are being harvested (Rudolph in litt. 1999). Depending on future silvicultural practices, this habitat could be substantially degraded within a few years.

B. Overutilization for commercial, recreational, scientific, or educational purposes. Take of Louisiana pine snakes for commercial, recreational, scientific, or educational purposes is not currently considered to be a threat. However, the low number of Louisiana pine snakes makes them vulnerable to unscrupulous collectors should locality data become available.

C. Disease or predation. Disease or predation is not currently considered to be a threat.

D. The inadequacy of existing regulatory mechanisms. The Louisiana pine snake is listed as threatened by the state of Texas and protected from unauthorized collection. This regulation does nothing to alleviate the loss of habitat which has caused the decline of the species. There is no protection for the Louisiana pine snake in Louisiana (S. Shively, Louisiana Natural Heritage Program, pers. comm. 1999).

E. Other natural or manmade factors affecting its continued existence. The longleaf pine savannas occupied by Louisiana pine snakes have historically been maintained by fire. Periodic burning promotes herbaceous vegetation and the presence of pocket gophers, and inhibits a shrubby midstory. Pocket gophers are a major prey item for the Louisiana pine snake and also the creators of burrows used extensively by the snakes (Rudolph and Conner 1996). Fire suppression decreases the quantity and quality of habitat available for pocket gophers. Habitat surveys conducted by Rudolph (pers. comm. 1999) indicate that changes in fire regimes may represent the greatest threat to Louisiana pine snake habitat quality in recent years. The use of prescribed burning as a management tool is being restricted by many foresters due to liability concerns. The best remaining Louisiana pine snake population occurs on industrial forest land where burning has been conducted historically. However, in the future it is likely that burning will be replaced by herbicide use at this site (D. Fuller, in litt. 1998). The effects of this change are unknown at present. If herbicide use alters the composition and/or density of the ground cover vegetation and pocket gophers decline in response, it is likely that Louisiana pine snakes will decline in numbers as well. Rudolph (in litt. 1999) trapped in poor quality habitat to determine use of these areas by Louisiana pine snakes. These habitats were degraded primarily as a result of fire suppression and the resultant excessively vegetated midstory. No snakes were captured in over 4,000 trap days.

The Louisiana pine snake has an extremely low reproductive rate. It produces a very small clutch of 3 to 5 large eggs (T. Vandeventer, pers. comm. 1999). Low fecundity (reproductive output) magnifies other threats and increases the likelihood of local extinctions.

Vehicle mortality, both on state roads and off-road trails, may cause significant impacts to the Louisiana pine snake's population numbers and community structure. Rudolph (in litt. 1999) documented the death of 12 of the snakes from his radio-telemetry study. Three of the 12 (25 percent) could be attributed to vehicle mortality. Additional research on the impact of roads on Louisiana pine snakes has been initiated. Results thus far indicate that roads with moderate to high traffic levels reduce adjacent snake populations by 50 to 75 percent and measurable impacts extend up to 850 meters (approximately one-half mile) from the roads (Rudolph in litt. 1997).

BRIEF SUMMARY OF REASONS FOR REMOVAL OR LISTING PRIORITY CHANGE:

FOR RECYCLED PETITIONS:

a. Is listing still warranted? ___

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? ___

c. Is a proposal to list the species as threatened or endangered in preparation? ___

d. If the answer to c. above is no, provide an explanation of why the action is still precluded.

LAND OWNERSHIP (Estimate proportion Federal/state/local government/private, identify non-private owners): Ownership is 30 percent Federal (Kisatchie National Forest and Fort Polk in Louisiana; Angelina and Sabine National Forests in Texas) and 70 percent private ownership.

PRELISTING (Describe status of conservation agreements or other conservation activities): A Conservation Agreement between the Fish and Wildlife Service (Region 2 has lead on the agreement), U.S. Forest Service, U.S. Department of Defense, Texas Parks and Wildlife Department, and Louisiana Department of Wildlife and Fisheries has been drafted and is under review by all parties.

The Service has provided funds, through the Endangered Species Private Landowner Incentive Program, to International Paper for habitat restoration and burning at Louisiana pine snake sites on their property. A habitat management plan for these sites is being developed.

REFERENCES (Identify primary sources of information (e.g., status reports, petitions, journal publications, unpublished data from species experts) using formal citation format):

Bridges, E.L. and S.L. Orzell. 1989. Longleaf pine communities of the West Gulf coastal Plain. Natural Areas Journal 9:246-253.

Burt, C.E. 1935. Contributions to Texas herpetology III. Bullsnakes of the genera Arizona and Pituophis. Journal of the Washington Academy of Sciences. 25:380-383.

Collins, J.T. 1997. Standard common and current scientific names for North American amphibians and reptiles. Fourth Edition. Society of the Study of Amphibians and Reptiles Herpetological Circular 25:1-40.

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Conant, R. and J.T. Collins. 1991. A field guide to reptiles and amphibians of eastern and central North America, third edition. Houghton Mifflin Company, Boston, MA. 450 pp.

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Dixon, J.R. 1987. Amphibians and reptiles of Texas. Texas A&M University Press, College Station, TX. 434 pp.

Dundee, H.A. and D.A. Rossman. 1989. The amphibians and reptiles of Louisiana. Louisiana State University Press, Baton Rouge, LA. 300 pp.

Frost, C.C. 1993. Four centuries of changing landscape patterns in the longleaf pine ecosystem. Pgs. 17-43 In: S.M. Hermann (ed.). Proceedings of the Tall Timbers Fire Ecology Conference, No. 18, The longleaf pine ecosystem: ecology, restoration and management. Tall Timbers Research Station, Tallahassee, FL.

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Mitchell, R.W. and D.W. Tinkle. 1960. Another Texas record for the Louisiana pine snake, Pituophis melanoleucus ruthveni Stull. Herpetologica 16:143-144.

Himes, J.G. 1998. Activity patterns, habitat selection, excavation behavior, growth rates, and conservation of the Louisiana pine snake (Pituophis melanoleucus ruthveni). Master's thesis, Louisiana State University, Shreveport, LA. 58 pp.

Jennings, R.D. and T.H. Fritts. 1983. The status of the black pine snake Pituophis melanoleucus lodingi and the Louisiana pine snake Pituophis melanoleucus ruthveni. U.S. Fish and Wildlife Service and University of New Mexico Museum of Southwestern Biology, Albuquerque, NM. 32 pp.

Knight, J.L. 1986. Variation in snout morphology in the North American snake Pituophis melanoleucus (Serpentes: Colubridae). Journal of Herpetology 20:77-79.

Reichling, S.B. 1988a. Reproduction in captive Louisiana pine snakes, Pituophis melanoleucus ruthveni. Herpetological Review 19:77-78.

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Reichling, S.B. 1990. Reproductive traits of the Louisiana pine snakes, Pituophis melanoleucus ruthveni (serpentes:Colubridae). Southwestern Naturalist 35:221-222.

Reichling, S.B. 1993. North American Regional Studbook for the black pine snake, Pituophis melanoleucus lodingi, and the Louisiana pine snake Pituophis melanoleucus ruthveni. Memphis Zoo and Aquarium, Memphis, TN.

Reichling, S.B. 1995. The taxonomic status of the Louisiana pine snake (Pituophis melanoleucus ruthveni) and its relevance to the evolutionary species concept. Journal of Herpetology 29:186-198.

Rudolph, D.C. 2000. Habitat quality at historical Louisiana pine snake localities. Unpublished report submitted to U.S. Fish and Wildlife Service, Jackson, MS. 11 pp. + tables and appendices.

Rudolph, D.C. and S.J. Burgdorf. 1997. Timber rattlesnakes and Louisiana pine snakes of the west Gulf Coastal Plain: hypotheses of decline. Texas Journal of Science 49:111-122.

Rudolph, D.C. and R.N. Conner. 1996. Radio-telemetry study of Louisiana pine snakes in eastern Texas and western Louisiana. Unpublished report to Texas Parks and Wildlife and Louisiana Department of Wildlife and Fisheries, Baton Rouge, LA. 7 pp.

Smith, H.M. and J.P. Kennedy. 1951. Pituophis melanoleucus ruthveni in eastern Texas and its bearing on the status of P. Catenifer. Herpetologica 7:93-96.

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Thomas, R.A., B.J. Davis, and M.R. Culbertson. 1976. Notes on variation and range of the Louisiana pine snake, Pituophis melanoleucus ruthveni Stull (Reptilia, Serpentes, Colubridae). Journal of Herpetology 10:252-254.

Vandeventer, T.L. and R.A. Young. 1989. Rarities of the longleaf: the black and Louisiana pine snakes. Vivarium 1:32-36.

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Walker, J.M. 1965. Notes on two rare Louisiana serpents. Herpetologica 21:159-160.

Wilks, B.J. 1962. The pine snake in central Texas. Herpetologica 18:108-110.

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Wright, A.H. and A.A. Wright. 1957. Handbook of snakes of the United States and Canada. Cornell University Press, Ithaca, NY. 1105 pp.

Young, R.A. and T.L. Vandeventer. 1988. Recent observations on the Louisiana pine snake, Pituophis melanoleucus ruthveni (Stull). Bulletin of the Chicago Herpetological Society 23:203-207.

LISTING PRIORITY (place * after number)

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5*
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes to the candidate list, including listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all additions of species to the candidate list, annual retentions of candidates, removal of candidates, and listing priority changes.

Approve: _____ _____
Regional Director, Fish and Wildlife Service Date

Concur: _____ _____
Director, Fish and Wildlife Service Date

Do not concur: _____ _____
Director, Fish and Wildlife Service Date

Director's Remarks: _____

_____

_____

Date of annual review: January 5, 2001

Conducted by: Linda LaClaire - Jackson, Mississippi FO

Changes from October 25, 1999 CNOR(check one) Yes X No

Approval: _____ _____
Regional Director Dated

Comments:

(rev. 6/00)